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*for your interest in Exact Electronics, Inc. products. The information you requested is enclosed. If you would like more information, or if you want our applications engineer to call, please use the enclosed reply card.*

For your convenience, Exact Electronics engineering representatives are located throughout the country as listed on the reverse side.



P. O. Box 160  
455 S. E. Second Ave.  
HILLSBORO, OREGON 97123

Phone  
648-6661  
Area Code 503

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## EXACT ELECTRONICS, INC.

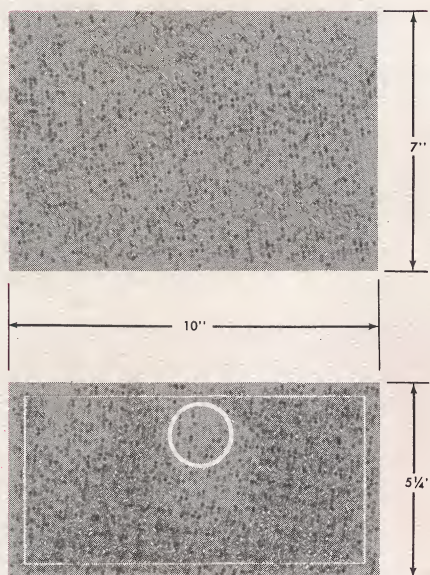
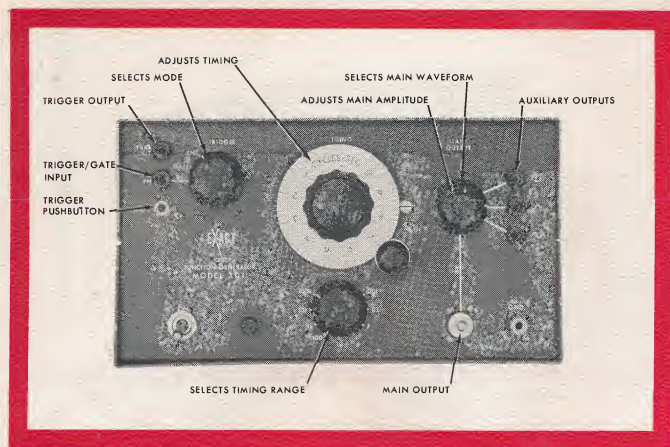
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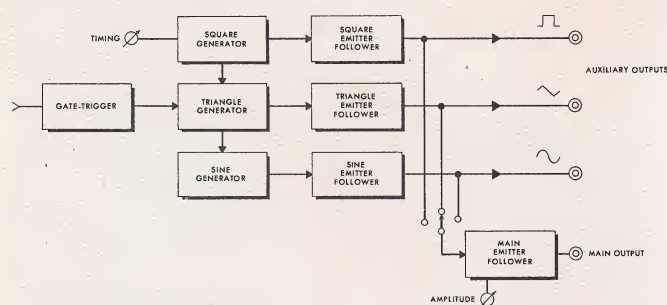






For location of your nearest representative, consult Electronic Engineers Master.

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electronic engineers master



## TENTATIVE SPECIFICATIONS

### OUTPUT FREQUENCY

Frequency Range..... 0.001 cps to 1 megacycle (9 ranges)  
Indicated Frequency Accuracy..... Within 3% of absolute  
Frequency Stability..... Short term (10 min.) 0.1%  
..... Long term (24 hrs.) 1%  
Frequency Response (Sine)..... Within 0.2 db to 100 kc  
..... 0.5 db to 1 mcs

### AUXILIARY OUTPUT

Amplitude (All Waveforms)... 12 v P-P min. into 500 ohms  
Output Impedance..... Terminated at 500 ohms  
DC Reference Level..... 10 volts fixed  $\pm 10$  mv

NOTE: The Auxiliary output is current protected.

### MAIN OUTPUT

Amplitudes (All Waveforms)... At least 10 v P-P (variable)  
..... into 52 ohms  
Output Impedance..... Terminated at 52 ohms  
DC Reference Level..... 0 volts fixed  $\pm 10$  mv  
Hum and Noise..... Greater than 80 db down  
DC Stability  
Short term (10 min.) Long term (24 hrs.)  
Square.....  $\pm 15$  mv  $\pm 30$  mv  
Triangle.....  $\pm 15$  mv  $\pm 30$  mv  
Sine.....  $\pm 25$  mv  $\pm 50$  mv  
Amplitude Stability..... Short term (10 min.) 0.2%  
..... Long term (24 hrs.) 2%

### SQUARE WAVEFORM

Risetime..... 10 nanosecs or faster  
Symmetry..... 99% to 100 kcs, 98% to 1 mcs  
Overshoot..... 2% max. (correctly terminated)  
Droop..... 2% max. (correctly terminated)

### TRIANGLE WAVEFORM

Linearity..... 99% to 100 kcs, 98% to 1 mcs  
Symmetry..... 99% to 100 kcs, 98% to 1 mcs

### SINE WAVEFORM

Distortion..... Less than 1.5% to 20 kcs  
..... Less than 2.5% to 1 mcs

### TRIGGERING and GATING

Trigger or Gate Signal..... On + 5 volts (approx.)  
..... Off + 2 volts (approx.)  
Maximum Gate Signal..... + 30 volts  
Gate Repetition Rate..... 990 kcs (max)

NOTE: The above measurements are made after a min. warm up time of 10 minutes.

### TRIGGER OUTPUT

Waveshape..... Differentiated squarewave (negative-going)  
Timing..... Coincident with squarewave output  
Risetime..... 50 nanoseconds (max)  
Amplitude..... 5 volts peak (min)  
Source Impedance..... 300 ohms

### POWER REQUIREMENTS

Line Voltage..... 95 to 130 or 190 to 260 v ac  
Line Frequency..... 50 to 400 cps  
Power..... Less than 15 watts

### PHYSICAL CHARACTERISTICS

Weight..... 6 lbs. net, 13 lbs. gross  
Volume..... 0.2 cu. ft. gross  
Dimension..... 10 w x 5-1/4 h x 7 d

### PRICE FOB FACTORY

Cabinet Model (301)..... \$550.00  
Rack-Mounting Model (301 RM)..... \$550.00  
Adjustable DC Reference Level Option..... \$ 25.00



# EXACT ELECTRONICS INC.

455 S.E. 2nd Avenue, Hillsboro, Oregon 97123

Telephone (503) 648-6661

TWX: 503-821-6927

Prices and specifications subject to change without notice.

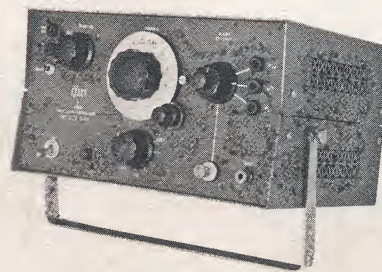


# TYPE 301

## Solid State

## FUNCTION

## GENERATOR



**TYPE 301 FUNCTION GENERATOR.** Here's an all solid state Function Generator that simultaneously produces four separate outputs. Three of the outputs are fixed amplitude square, triangle, and sine waveforms. The fourth output (MAIN) is switched to provide any of the three waveforms, with adjustable amplitude. The 301 is a reliable high frequency Function Generator for use in circuit design, equipment checkout and calibration, and in quality control applications.

### OPTIONAL MAIN OUTPUT DC LEVEL CONTROL.

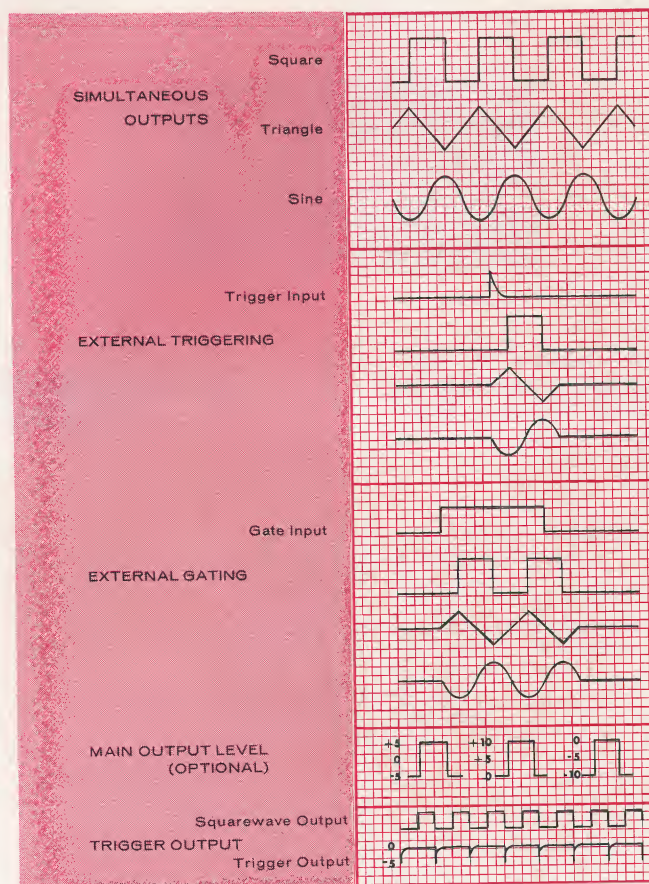
This optional addition to the 301 provides a front panel control which enables the main output waveform dc level (center of square, triangle, and sine waveforms) to be adjusted between -5 and +5 volts or in the switched position, set to approximately 0 volts.

**SIMULTANEOUS OUTPUTS.** All of the outputs are simultaneous and synchronized throughout the frequency range. Phase relationship is unique in that the triangle and sine waveform peaks occur at the rise and fall points of the square waveform.

**EXTERNAL TRIGGERING/GATING.** The 301's flexibility is best demonstrated when operated in the externally-triggered mode. In this mode, one trigger pulse produces one complete cycle at all outputs, simultaneously. A pushbutton permits manual triggering of the outputs for one-shot applications. Triggered waveforms are adjustable (timing controls) from 1 microsecond to over 16 minutes duration. Also, gated operation is available. In this mode, all outputs are simultaneously generated while the input gate-level is present, with automatic last cycle completion when the input gate-level is removed.

**PACKAGING.** The 301 is approximately 5-1/4" high by 10" wide, and weighs only eight lbs net. Front panel is dark grey in color, with silkscreened white callouts. Cabinet is medium grey. All exterior finishes are oven baked for durability.

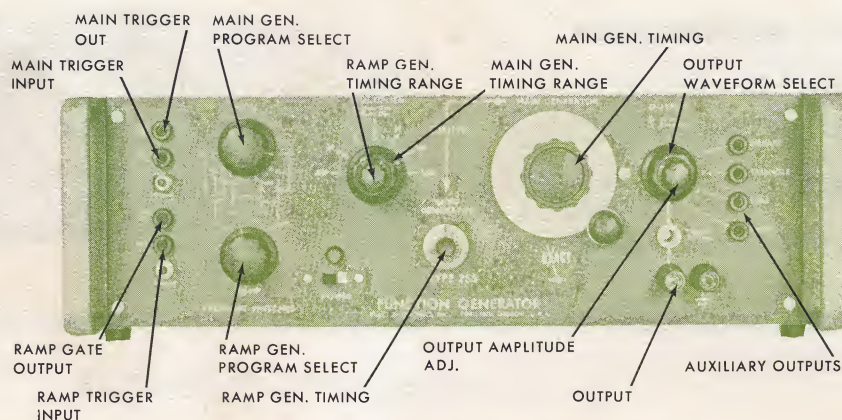
- \* ALL SOLID STATE
- \* 10 NANOSECOND RISETIME
- \* SIMULTANEOUS OUTPUTS
- \* SQUARE-TRIANGLE-SINE
- \* 0.001 cps to 1mc-ALL WAVEFORMS
- \* 10 volts P-P into 52 ohms
- \* TRIGGERED & GATED MODES



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## SPECIFICATIONS

### MAIN OUTPUT

Amplitude ..... 0 to 25 volts p-p (min)  
 ..... 25 volts into 5K load  
 Stability/Repeatability .... 50 mv (10 min), 300mv(24 hrs)  
 Amplitude Change with Frequency ..... 0.5% to 1 kc  
 ..... 1% to 10 kc  
 Amplitude Change with Function ..... 2% max  
 DC Reference Level ..... 0 volts  
 Frequency Range ..... 0.001 cps to 10 kc  
 Frequency Deviation from Absolute ..... 3% max  
 Long Term Frequency Stability .....  $\pm 1\%$

### EXTERNAL TRIGGERING

Trigger Input Pulse ..... 1 usec risetime (min)  
 ..... -10v min amplitude  
 ..... less than 1 usec delay between  
 ..... -10v point and start of waveform

### TRIGGER OUTPUT

Waveform ..... differentiated squarewave  
 Amplitude ..... -25 volts(min)

### GATE OUTPUT

Amplitude ..... 35 volts  
 Frequency ..... Synchronized with ramp

### POWER REQUIREMENTS

Line Voltage ..... 105 to 125 or 200 to 250 vac  
 Line Frequency ..... 50 to 400 cps  
 Power ..... 175 watts

### PHYSICAL CHARACTERISTICS

Weight ..... 21 lbs net, 28 lbs gross

Volume ..... 2 cu ft gross  
 Dimensions ..... 16-3/4w X 5-1/4h X 13d

### SQUARE WAVEFORM

Risetime ..... 5 usecs or faster  
 Symmetry ..... 99.5%  
 Overshoot ..... 1% max  
 Droop ..... 1% max

### TRIANGLE WAVEFORM

Linearity ..... 99.5%  
 Symmetry ..... 99.5%

### SINE WAVEFORM

Total Distortion ..... Less than 2% over entire  
 frequency range

### RAMP WAVEFORM

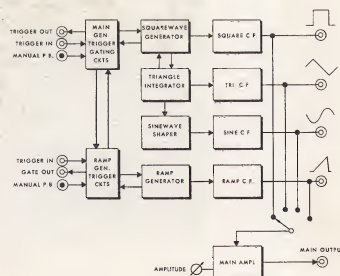
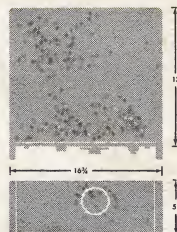
Linearity ..... 99.5%  
 Fall Time ..... 1% to 5 kc  
 ..... 1.5% to 10 kc  
 Timing Dial Accuracy .....  $\pm 1\%$  of absolute  
 Dead Time ..... Less than 0.1% of period

### AUXILIARY OUTPUTS

Amplitude ..... 30 volts p-p (min)  
 ..... 30 volts into 7K load  
 Stability/Repeatability ..... Same as main  
 Amplitude Change with Frequency ..... Same as main  
 DC Reference Level ..... Same as main  
 Frequency Range ..... Same as main

### PRICE

F.O.B. Factory ..... \$ 785.00



For the location of your  
 nearest representative,  
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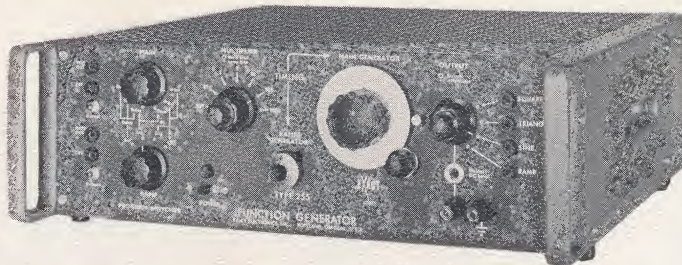
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# TYPE 255 FUNCTION GENERATOR



## TYPE 255 FUNCTION GENERATOR

- \* SEPARATE RAMP TIMING
- \* SIMULTANEOUS OUTPUTS
- \* SQUARE-TRIANGLE-SINE-RAMP
- \* 0 to 25 VOLTS P-P
- \* 0.001 CPS to 10 KC
- \* TRIGGER/GATE/DELAY MODES

### TYPE 255 FUNCTION GENERATOR

The Type 255 is the most flexible of Exact Function Generators. Basically, it consists of two completely independent generators ... a MAIN generator which produces simultaneous square, triangle and sine waveforms, and a RAMP generator which produces ramp waveforms. The two generators have separate timing and multiplier (frequency) controls. The MAIN generator can be externally triggered and provides a separate trigger output signal. The RAMP generator can also be externally triggered and provides a trigger output (GATE) signal. Two mode switches interconnect input/output trigger waveforms between both generators, providing many gating, pulsing, and delaying modes of operation. The 255 is ideally suited as a general purpose instrument in laboratories where flexibility is a must ... where free-running, pulsed, burst and other waveform patterns are required.

### SEPARATE RAMP GENERATOR

Separate frequency controls allow independent adjustment of ramp time base from 100 usecs to over 16 minutes. The ramp generator can be operated free-running, externally triggered, or triggered by the main generator. When the ramp is triggered by the main generator, ramp duration and off-time between ramp waveforms are separately adjustable.

### TRIGGER/GATE/DELAY OPERATION

The 255 provides many different modes of triggered, gated and delayed operation. Figures three through nine show some of the available outputs. Either generator (main or ramp) can be externally triggered and the output used to delay-trigger the other generator. Also, the ramp generator can gate the main generator to produce a burst of square, triangle, and sine waveforms.

### MAIN OUTPUT

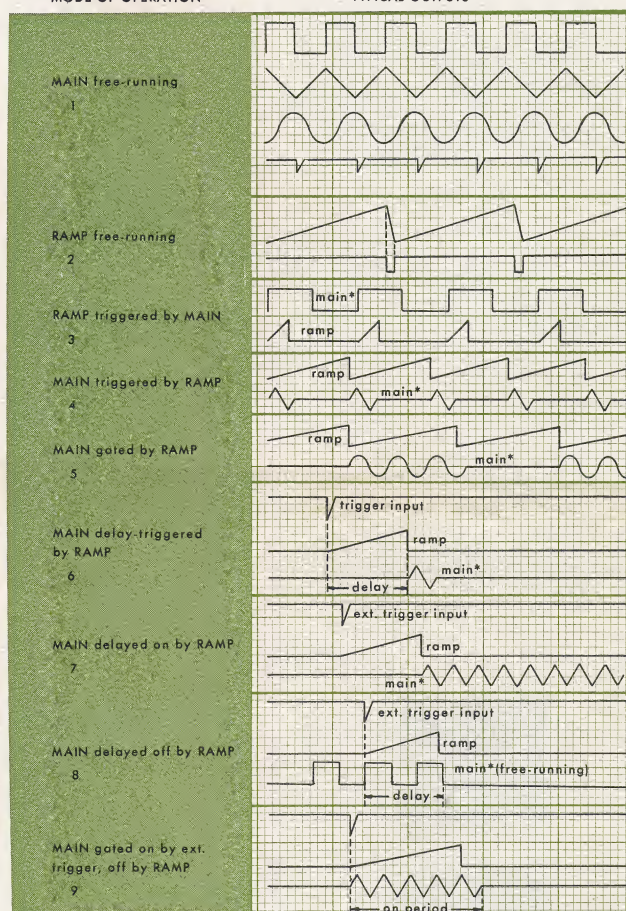
The main output is switched to provide square, triangle, sine or ramp waveforms with amplitude adjustable from 0 to over 25 volts p-p. Dc reference level is fixed at 0 volts, and is the center of the square, triangle and sine waveforms and the base of the ramp waveform. The HOLDOFF DC LEVEL control permits shifting the starting point of triggered sine and triangle waveforms from 0° to more than 170° (triggered and gated waveforms are completed at 360° from the starting point).

### PACKAGING

The 255 is 5-1/4" high by 16-3/4" wide, and weighs only 21 lbs net. The 255 can be supplied in rackmount version (255RM) at no additional cost. Front panel is dark grey in color, with silk-screened white callouts. End bells and cabinet are medium grey. All exterior finishes are oven baked for durability.

### MODE OF OPERATION

### TYPICAL OUTPUTS



\*MAIN output can be either square, triangle or sine waveforms



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